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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,697	09/30/2003	Ananda Baer	HSJ9-2003-0032US1 (0107-0	6166

7590 11/26/2004

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EXAMINER	
ARANCIBIA, MAUREEN GRAMAGLIA	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/675,697	BAER ET AL.	
	Examiner	Art Unit	
	Maureen G. Arancibia	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 8 recites that the protective layer formed during the definition of the stripe height can comprise lead materials. However, the Specification only discloses that this first protective layer can comprise insulating materials; it is the second protective layer that is disclosed to comprise lead materials. (Page 3, Lines 14-25) Claims 9, 22, and 28 recite that the protective layers can each have a thickness of about 50-200 Angstroms. However, the Specification discloses that the first protective layer can have a thickness of 100-200 Angstroms, and the second protective layer can have a thickness of 50-100 Angstroms. (Page 6, Line 28; Page 9, Line 18) The total range is not recited in the Specification.

Claim Objections

2. Claims 7, 9, 10, 11, and 17-22 are objected to because of the following informalities: The claims recite, "prior to *removing* the [first] photoresist layer." (emphasis added) While this statement is not incorrect, the meaning of the claims might be clearer if they recited, "prior to *applying* the photoresist layer."

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-10, 12-20, 22-26, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,315,875 to Sasaki in view of U.S. Patent Application Publication 2004/0027730 to Lille.

In regards to Claim 1, Sasaki teaches a method of forming a read sensor for a magnetic head, comprising, prior to forming a track width for a read sensor: forming a first photoresist layer 21 in a central region over a plurality of read sensor layers (Figures 13-14; Column 12, Lines 1-5); etching the read sensor layers to define a stripe height for the read sensor (Figure 16; Column 12, Lines 55-62); and removing the photoresist layer. (Column 13, Line 2)

In regards to Claims 1 and 6, Sasaki does not expressly teach that the photoresist can be removed by mechanical compression with a chemical-mechanical polishing (CMP) pad.

Lille teaches that a photoresist used in a method of forming a read sensor can be sheared off by CMP. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille in the practice of Sasaki. The motivation for doing so, as taught by Lille (Paragraph 53), is that CMP can successfully remove the resist even when other materials have been deposited on it.

In regards to Claim 2, Sasaki does not expressly teach that the photoresist 21 can be formed without an undercut.

Lille teaches that a photoresist 2002 used in a method of forming a read sensor can be formed without an undercut. (Figure 20; Paragraph 45)

It would have been obvious to form the photoresist taught by Sasaki without an undercut, as taught by Lille. The motivation for doing so would have been to form the photoresist in a single step, rather than depositing it in two layers, as Lille discloses is also known in the prior art (Paragraph 45).

In regards to Claim 3, Sasaki teaches that the method further comprises, after defining the stripe height: forming a second photoresist layer 23 in a central region over the read sensor layers (Column 13, Lines 27-29), and etching the exposed portions of the read sensor layers to define a track width W for the read sensor. (Figure 19; Column 13, Lines 32-34)

In regards to Claim 4, Sasaki also teaches forming hard bias layer 61 and lead layer 6 around the read sensor (Figure 19; Column 13, Lines 38-61), and removing the second photoresist 23 (Column 13, Lines 57-58).

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille to remove the second photoresist as well. The same reasoning applies as was discussed in regards to Claim 1.

In regards to Claims 5 and 8, Sasaki teaches that after the read sensors are etched using the photoresist as a mask, and prior to removing the photoresist, an insulating layer 4b is formed around the read sensor. (Column 12, Line 63 - Column 13, Line 2)

In regards to Claim 7, Sasaki teaches a protective layer 5g of tantalum between the read sensor layers and the photoresist layer. (Figure 13; Column 11, Line 58)

In regards to Claims 9 and 10, Sasaki does not expressly teach that the protective layer 5g can have a thickness of 50-200 Angstroms, and can comprise carbon.

Lille teaches a protective layer 908, formed between the read sensor layers and the photoresist of diamond-like carbon (DLC) with a thickness of 40-200 Angstroms. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to make the protective layer of diamond-like carbon (DLC) with a thickness of 40-200 Angstroms, as taught by Lille. The motivation for doing so would have been to have a protective layer that is CMP-resistant. (Paragraph 53)

In regards to Claim 12 and 16, see the discussion of Claims 1 and 4.

In regards to Claim 13, Sasaki teaches that after the read sensors are etched using the photoresist as a mask, and prior to removing the photoresist, an insulating layer 4b is formed around the read sensor. (Column 12, Line 63 - Column 13, Line 2)

In regards to Claim 14, Sasaki also teaches forming hard bias layer 61 and lead layer 6 around the read sensor (Figure 19; Column 13, Lines 38-61).

In regards to Claim 15, it would have been obvious to one of ordinary skill in the art to form both photoresists without undercuts, as taught by Lille. The same reasoning applies as was discussed in regards to Claim 2.

In regards to Claim 17, Sasaki teaches protective layer 5g between the read sensor layers and the photoresist layer. (Figure 13; Column 11, Line 58)

In regards to Claim 18, see the discussion of Claim 10.

In regards to Claims 19, 20, and 22, Sasaki teaches first protective layer 5g that is formed prior to applying the first photoresist layer.

Sasaki teaches that a second protective layer 7a can be formed after removing the second photoresist. (Column 13, Lines 62-65)

Sasaki does not expressly teach that the second protective layer can be formed prior to forming the second photoresist layer.

Nevertheless, it would have been obvious to one of ordinary skill in the art to form the second protective layer before forming the second photoresist layer. The motivation for doing so would have been to protect the center read sensor layers during the process of defining the track width.

It would also have been obvious to one of ordinary skill in the art to make both protective layers of DLC, with a thickness of about 50-200 Angstroms, as taught by Lille. The same reasoning applies as was discussed in regards to Claims 9 and 10.

In regards to Claim 23, see the discussion of Claims 1, 2 and 7.

In regards to Claims 24 and 25, see the discussion of Claim 4. It would also have been obvious to one of ordinary skill in the art to form the second photoresist without undercuts, as taught by Lille. The same reasoning applies as was discussed in regards to Claim 2.

In regards to Claims 26 and 28, it would have been obvious to one of ordinary skill in the art to form protective layer 5g with a thickness of 50-200 Angstroms, and for it to comprise carbon, as taught by Lille. See the discussion of Claims 9 and 10.

In regards to Claim 29, Sasaki teaches that protective layer 5g is formed under the first photoresist and over the read sensor layers.

In regards to Claim 30, Sasaki teaches that protective layer 5g is formed over the read sensor layers and insulating layer 2. (Column 7, Line 50)

5. Claims 11, 21, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Lille, and further in view of U.S. Patent Application Publication 2002/0030443 to Konuma et al.

The teachings of Sasaki and Lille were discussed above.

The combination of Sasaki and Lille does not expressly teach that the hardness of the DLC protective layer can be 22 GPa.

Konuma et al. teaches that a DLC thin film can have a hardness of 15-25 GPa. (Paragraph 82)

It would have been obvious to one of ordinary skill in the art to make the DLC films taught by the combination of Sasaki and Lille with a hardness of 22 GPa, which is in the range taught by Konuma et al. The motivation for doing so, as taught by Konuma et al. (Paragraph 82), would have been to have a film that was not only hard, but did not transmit oxygen or moisture.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 11-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Maureen G. Arancibia

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primary Examiner
AU 1763